

## **HR-251 Roadway Lighting on Secondary Roads**

**Key Word:** Secondary roads, Destination lighting, Intersections

### **ABSTRACT**

There are approximately 800 installations of destination lighting at secondary road intersections in Iowa. Approximately 90% of these have only a single luminaire. The other installations have two luminaires. No warrants currently exist for justifying the use of this type of lighting.

Previous research has examined the safety benefits from full lighting of rural intersections that generally serve substantially higher traffic volumes than secondary road intersections in Iowa. However, the safety benefit of destination lighting at intersections carrying relatively low volumes has not been the subject of previous research.

The research reported here, sponsored by the Iowa Department of Transportation, was undertaken to identify locations where destination lighting could be expected to improve highway safety. If destination lighting were shown to reduce accident frequency, warrants for its use on secondary roads could be developed.

An inventory of secondary road lighting installations in Iowa was assembled. From this inventory, two samples were constituted that would permit two separate comparisons of the accident experience with and without destination lighting. Before and after comparisons were made for the same locations if accident records were available for at least one full year both preceding and following the installation of destination lighting. Accident records for this purpose were available from a statewide computerized record system covering the period from 1977 through 1982. The accident experience at locations having destination lighting installed before 1978 was compared with a sample of comparable locations not having destination lighting.

The sample of secondary road intersections used for the before and after comparison included 91 locations. The sample of continuously lighted locations included 102 intersections. Accident experience at these locations was compared with the experience at 102 intersections that were not lighted.

The intersections included in these samples averaged only 0.31 accidents per year. The accident rate at secondary road intersections that had destination lighting did not differ significantly from the accident rate at intersections that were not lighted. This conclusion was derived from both comparisons, the before

and after experience and the comparison of experience at intersections that were continuously lighted with that at unlighted locations.

Furthermore, no significant differences were noted between lighted and unlighted locations in the proportion of accidents that occurred at night. The distribution of accidents by type also did not differ between unlighted intersections and those having destination lighting. It was not possible to formulate warrants for destination lighting since analyses directed toward identifying specific characteristics of an intersection that could be correlated with highway safety did not yield any useful relationships.

However, it was noted that the average damages for night accidents that occurred at lighted intersections were lower than for accidents at unlighted intersections. Even in the absence of a more definitive demonstration of beneficial effects, destination lighting is perceived by officials in most of the counties having such installations as yielding desirable effects and is recognized as helpful to motorists in performing the guidance function in driving. Given this benefit and a relatively low cost (an average of \$74 per year for one luminaire), and given that the subjective criteria that have been used in the past to justify the installation of destination lighting have led to a high degree of public acceptance and satisfaction, it is recommended that the same subjective criteria continue to be used in lieu of definitive warrants.